IN THE CLAIMS:

1. (original): A method for routing a plurality of packets between a plurality of sources and a plurality of destinations in a network, the method comprising:

inserting a source timestamp value into each packet, each source timestamp value indicating the time at which said each packet exits the source;

determining when no additional packets received at a given switch element input will have a source timestamp value earlier than a specified value;

deriving information about source timestamp values of later arriving packets; and

propagating the packets through switch elements in the network in a predetermined order using the source timestamp values together with the derived information about source timestamp values of later arriving packets.

2. (original): The method of claim 1, wherein the predetermined order is the order that the plurality of packets entered the network.

3. (original): The method of claim 1, further including sensing a status message establishing a lower bound on the source timestamp values of the additional packets.

4. (original): The method of claim 1, further including selecting packets to be forwarded in increasing order of their associated source timestamp values.

5. (original): A switching element of an interconnection network for routing a plurality of packets between a plurality of sources and a plurality of destinations via a plurality of paths, the switching element for forwarding packets in an order according to a value of a source timestamp, the switching element comprising:

a plurality of arrival buffers;

a plurality of departure buffers;

means for moving the packets into the plurality of departure buffers so as to cause the packets to be delivered to the destinations;

means for sensing when no subsequent packets which enter each of the plurality of arrival buffers will have a source timestamp having a value earlier than a specified value; and

means for moving the packets from the arrival buffers to the plurality of departure buffers so that individual packets leave each departure buffer in the order according to their timestamp values.

6. (original): The switching element of claim 5, wherein each of the plurality of data packets has associated therewith one of a plurality of priority classes, and wherein each of the plurality of arrival buffers and each of the plurality of departure buffers are operative to accept data packets having associated therewith one of the plurality of priority classes.

7. (original): The switching element of claim 5, wherein each of the plurality of arrival buffers and each of the plurality of departure buffers are operative to accept packets based on intended destination.

8. (original): The switching element of claim 5, further including means for transmitting and receiving packet transmission control messages for selectively postponing reception of data packets.

9. (original): The switching element of claim 5, wherein the sensing means is operative to sense status messages communicated between adjacent switch elements.

10. (original): The switching element of claim 5, wherein the interconnection network is a folded network, the switching element includes first and second groups of arrival and departure buffers and wherein control packets and information packets are transmitted and received via paths in common with data packets.

11. (original): A switching element of for use in an interconnection network for forwarding a plurality of packets in an order according to a source timestamp value, the switching element comprising:

a plurality of arrival buffers;

a plurality of departure buffers;

means for moving the plurality of packets into the plurality of departure buffers;

means for sensing when no additional packets which enter each of the plurality of arrival buffers will have an individual source timestamp value earlier than a specified value; and

means for moving the plurality of packets from the plurality of arrival buffers to the plurality of departure buffers so that individual packets leave each the plurality of departure buffer in the order according to their source timestamp values.

12. (represented - formerly dependent claim 17): A method comprising:

selecting a plurality of candidate packets, each of the plurality of candidate packets being selected from a different one of a plurality of arrival buffers and being either one of a plurality of data packets or a status message, the status message acting as a packet substitute having associated therewith a derived timestamp value for indicating that no subsequently-received data packet in a designated arrival buffer shall have a source timestamp value earlier than the derived timestamp value associated with the status message;

comparing said source timestamp values and the derived timestamp values associated with each one of the plurality of candidate packets to determine an earliest timestamp value;

determining a set of candidate packets from the plurality of candidate packets having the earliest timestamp value associated therewith; ~~and~~

propagating each data packet within the set of candidate packets from a corresponding one of said plurality of arrival buffers to one of a plurality of departure buffers, and creating a new status message in each corresponding one of the plurality of arrival buffers that contains no data packets

transmitting a first departure data packet from one of the plurality of departure buffers to a first preselected downstream neighbor switching element after receiving a first grant signal from the first preselected downstream neighbor switching element; and

transmitting a departure status message to a second preselected downstream neighbor element after receiving a second grant signal from the second preselected downstream neighbor element, the departure status message indicating an earliest source timestamp value of any data packet that might be subsequently transmitted to the second preselected downstream neighbor element.

13. (original): The method according to claim 12, further including selecting one of the plurality of departure buffers for each said data packet within the set of candidate packets based on the occupancy of each of the plurality of departure buffers.

14. (original): The method according to claim 12, further including selecting one of the plurality of departure buffers for each said data packet within the set of candidate packets based on a destination of said data packet.

15. (original): The method according to claim 12, further comprising sending a grant signal to an upstream neighbor switching element in order to authorize the upstream neighbor switching element to transmit a new data packet to one of said plurality of arrival buffers.

16. (original): The method according to claim 12, further comprising transmitting either a departure data packet from one of the plurality of departure buffers or a departure status message to each of a plurality of downstream neighbor switching elements.

17. (cancelled).

18. (cancelled).

19. (original): A switching element of a multistage interconnection network comprising:

a set of arrival buffers to receive a plurality of packets to be resequenced;

a set of departure buffers to temporarily store packets to be transferred from the switching element;

control logic to recognize when no future packets received at the set of arrival buffers will indicate a source timestamp value earlier than a predetermined value; and

a data transfer mechanism to move the packets from the set of arrival buffers to the set of departure buffers such that individual packets exit each of the set of departure buffers in an order based on the respective timestamp values of the individual packets.

20. (original): The switching element of claim 19, wherein the data transfer mechanism determines in which of the set of departure buffers to place a particular packet based on an indicated destination of the particular packet.

21. (original): The switching element of claim 19, wherein at least a subset of the plurality of packets have associated therewith one of a plurality of service types, and wherein each of the set of arrival buffers and each of the set of departure buffers are operative to accept data packets having associated therewith at least one of the service types.

22. (original): The switching element of claim 21, wherein the service types comprise a service quality or a service priority.

23. (original): The switching element of claim 21, wherein the service types each have an associated priority level; wherein the data transfer mechanism selects a first packet to move to one of the set of departure buffers over a second packet within one of the set of arrival buffers when the first packet has associated with it a higher priority and later timestamp value in the order than the priority and timestamp value associated with the second packet.

24. (new): A method for distributed resequencing of packets in a packet switching system, the method comprising:

identifying one or more floor indications received by a switching element, each of said one or more floor indications associated with a respective timestamp value;

identifying one or more data packets received by a switching element, each of said one or more data packets associated with a respective timestamp value;

finding an earliest timestamp value associated with said one or more floor indications and said one or more data packets; and

in response to identifying that not one of said data packets has associated therewith the earliest timestamp value, discontinuing forwarding of said one or more data packets during a current cell time.

25. (new): The method of claim 24, wherein time remains in the current cell time to forward at least one of said one or more data packets when said discontinuing forwarding of said one or more data packets during the current cell time is performed.

26. (new): The method of claim 24, comprising in response to identifying that a particular data packet of said data packets has associated therewith the earliest timestamp value, forwarding the particular data packet during the current cell time.

27. (new): The method of claim 26, wherein said forwarding the particular data packet during the current cell time includes removing the particular data packet from an arrival buffer and if said removing causes the arrival buffer to become empty, in response adding a new floor indication to the arrival buffer.

28. (new): A method for distributed resequencing of packets in a packet switching system, the method comprising:

identifying one or more floor indications received by a switching element, each of said one or more floor indications associated with a respective timestamp value;

identifying one or more data packets received by a switching element, each of said one or more data packets associated with a respective timestamp value;

finding an earliest timestamp value associated with said one or more floor indications and said one or more data packets;

in response to identifying that a particular data packet of said data packets has associated therewith the earliest timestamp value, forwarding the particular data packet during the current cell time;

wherein said forwarding the particular data packet during the current cell time includes removing the particular data packet from an arrival buffer and if said removing causes the arrival buffer to become empty, in response adding a new floor indication to the arrival buffer.

29. (new): An apparatus for distributed resequencing of packets in a packet switching system, the method comprising:

means for identifying one or more floor indications received by a switching element, each of said one or more floor indications associated with a respective timestamp value;

means for identifying one or more data packets received by a switching element, each of said one or more data packets associated with a respective timestamp value;

means for finding an earliest timestamp value associated with said one or more floor indications and said one or more data packets; and

means for discontinuing forwarding of said one or more data packets during a current cell time in response to identifying that not one of said data packets has associated therewith the earliest timestamp value.

30. (new): The apparatus of claim 29, wherein time remains in the current cell time to forward at least one of said one or more data packets when said discontinuing forwarding of said one or more data packets during the current cell time is performed.

31. (new): The apparatus of claim 29, comprising means for forwarding the particular data packet during the current cell time in response to identifying that a particular data packet of said data packets has associated therewith the earliest timestamp value.

32. (new): The apparatus of claim 31, wherein said means for forwarding the particular data packet during the current cell time includes means for removing the particular data packet from an arrival buffer and if said removing causes the arrival buffer to become empty, in response adding a new floor indication to the arrival buffer.

33. (new): An apparatus for distributed resequencing of packets in a packet switching system, the method comprising:

means for identifying one or more floor indications received by a switching element, each of said one or more floor indications associated with a respective timestamp value;

means for identifying one or more data packets received by a switching element, each of said one or more data packets associated with a respective timestamp value;

means for finding an earliest timestamp value associated with said one or more floor indications and said one or more data packets;

means for forwarding the particular data packet during the current cell time in response to identifying that a particular data packet of said data packets has associated therewith the earliest timestamp value;

wherein said means for forwarding the particular data packet during the current cell time includes means for removing the particular data packet from an arrival buffer and if said removing causes the arrival buffer to become empty, in response adding a new floor indication to the arrival buffer.